

TYPHOON ELLIS (14)

Typhoon Ellis developed from a disturbance that was first detected within the monsoon trough south of Ponape on 15 August. From initial detection to the issuance of a Tropical Cyclone Formation Alert (TCFA) on 18 August, the disturbance slowly acquired convective organization. Once organized, development was quite rapid, with Ellis reaching a peak intensity of 125 kt (64 m/sec) on 23 August.

The TCFA was issued at 180100Z when satellite imagery identified a cloud mass near 8N 151E that had acquired an upper-level outflow channel to the southwest. At 180402Z, the initial reconnaissance aircraft mission located a 20 kt (10 m/sec) circulation center 85 nm (157 km) northwest of Truk Atoll. During the next 24 hours, satellite imagery provided fix positions on the convective center that showed movement toward the west-northwest at speeds approaching 16 kt (30 km/hr).

Based on continued convective organization, the first warning was issued

for Tropical Depression 14 at 181800Z. At 191108Z, data from the second reconnaissance aircraft mission indicated maximum winds of 35 kt (18 m/sec) were present and, at 191200Z, Tropical Depression 14 was upgraded to Tropical Storm Ellis. On the 19th Ellis began tracking more northward in response to weaker steering currents south of 15N. From the first warning until the seventh warning (200600Z) the forecast scenario anticipated an initial jog to the northwest then, as Ellis began interacting with the subtropical ridge, it would return to a more westward heading. However, a deep mid-latitude trough (near 40N 115E at 200000Z) began to weaken the subtropical ridge southwest of Japan and the anticipated westward movement never materialized. By 201200Z, the effects of this mid-latitude trough on the strength of the subtropical ridge became evident and the forecast track was shifted toward the northwest.

On 20 August, satellite imagery (Figure 3-14-1) indicated the development of a banding-type eye. Ellis was upgraded to typhoon strength at 210000Z when both

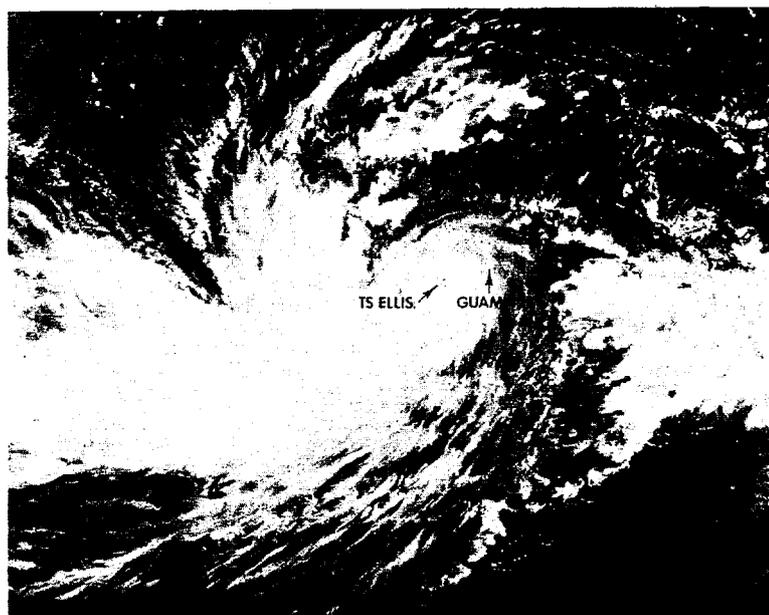


Figure 3-14-1. As an intense tropical storm, Ellis was exhibiting a strong southwest upper-level outflow pattern during a period when a banding-type eye was forming. 200510Z August (NOAA 7 visual imagery).

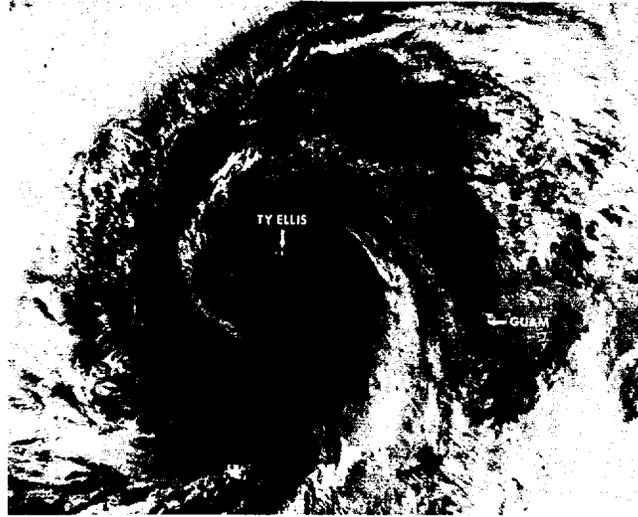


Figure 3-14-2. Typhoon Ellis, with strong upper-level outflow to the east and the southwest, was nearing a peak intensity of 125 kt (64 m/sec) at 221730Z August (NOAA 7 infrared imagery).

aircraft and satellite data supported an intensity greater than minimum typhoon strength (64 kt (33 m/sec)). In the following days, Ellis continued to develop rapidly, passing 100 kt (51 m/sec) intensity on 22 August and peaking at 125 kt (64 m/sec) on 23 August. Figure 3-14-2 shows Ellis just seven hours prior to reaching its maximum intensity.

By 230000Z, significant height falls were evident in the mid-tropospheric levels along the Ryukyu Islands, northwest of Ellis. The mid-latitude trough which had previously influenced Ellis's north-westward track was moving into the Yellow Sea. A day earlier, Ellis had shifted to

a north-northwestward track as the subtropical ridge continued to weaken south of Japan. Interestingly, the 14 warnings issued from 221800Z to 260000Z consistently identified Ellis track within 30 nm (56 km) of the eventual best track up to 29N. During this period, both the analyses and numerical forecast fields maintained a very good relationship between the mid-latitude trough near Korea and the subtropical ridge, east of Japan.

As Ellis moved east of Okinawa on 25 August (Figure 3-14-3) its movement shifted toward the north. As early as 240000Z, JTWC forecasts began to anticipate this movement

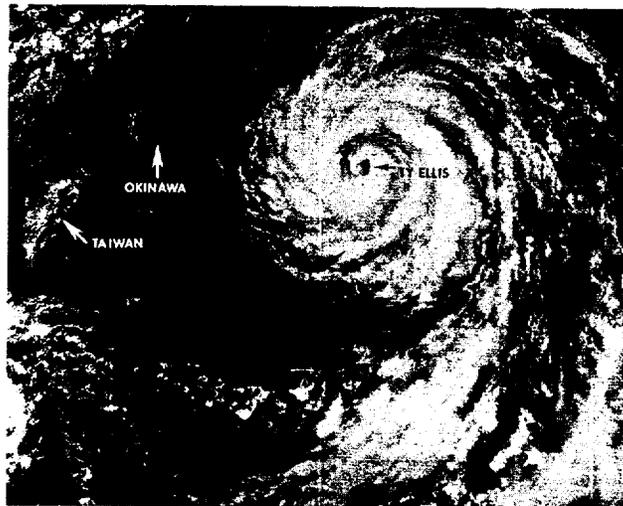


Figure 3-14-3. Typhoon Ellis, located 140 nm (259 km) east of Okinawa, was approaching the mid-latitude westerlies and subsequent acceleration toward the north. 250551Z August (NOAA 7 visual imagery).

as well as significant acceleration as Ellis approached 28N, based on guidance from the Typhoon Acceleration Prediction Technique (TAPT) (Weir, 1982). Unfortunately Ellis slowed to 7 kt (13 km/hr) while approaching 28N and the early acceleration forecasts became premature in the timing of the initial acceleration. However, as Ellis crossed 28N, the predicted acceleration occurred and the speeds attained were very close to those predicted by TAPT.

Once the acceleration was underway, Ellis commenced a more rapid weakening trend as the combined effects of increasing vertical wind shear and interaction with the topography of Kyushu, Skikoku and western Honshu reduced Ellis to an estimated 45 kt

(23 m/sec) intensity as it entered the Sea of Japan.

Ellis moved toward the north-northeast on 26 August and passed along Kyushu's eastern coastline and then just west of Hiroshima on 27 August. This jog to the north-northeast was costly for the region, as torrential rains (as much as 28 inches (71 cm) in 24 hours), flooding, landslides, and high winds brought much of southwestern Japan to a virtual standstill. Having left much of its fury behind, Ellis entered the Sea of Japan on 27 August and rapidly transitioned into an extratropical low pressure system which would later move northwestward, passing 120 nm (222 km) west of Vladivostok, USSR.